

Every Thing, Something, Nothing:

Zen and "Indicators" of the Upper Mississippi River System

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因繁就简
——孔子

“Pursue simplicity, forgo complexity”

--- Confucius

“When your only tool is a hammer,
everything looks like a nail.”

-- B. Franklin

(via Bob Meade, USGS)

.. Everything is an Indicator of Something,

But Nothing is an Indicator of Everything.

(Cairns, et al. 1993)

Outline:

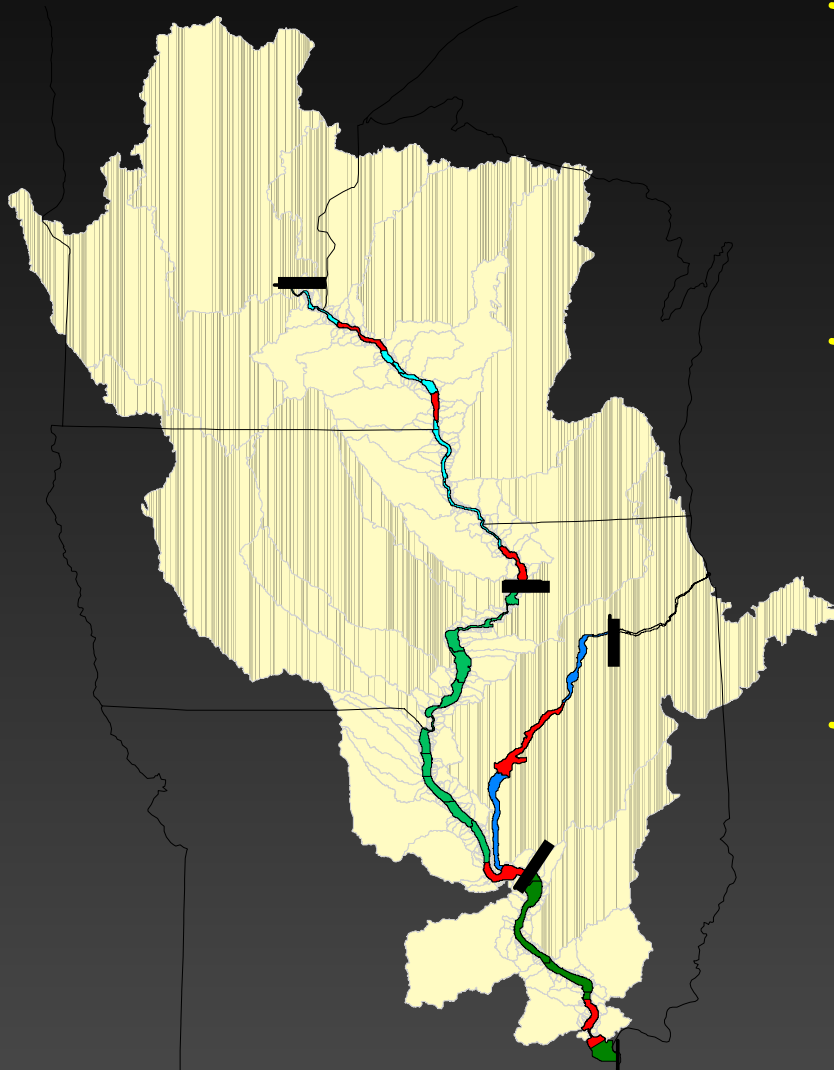
Indicator selection -

Ideal (Cairns, et al. 1993) vs Reality (LTRMP)

Monitoring INSIDE the Management Box

Ideal (Harwell, et al. 1999) vs Reality (LTRMP)

An Upper Miss./Monitoring Program Primer (in one slide)



The Target "System" -

- Commercially navigable channels and floodplains

The Problems -

- Sedimentation
- Navigation
- Altered Flows

The Information Needs -

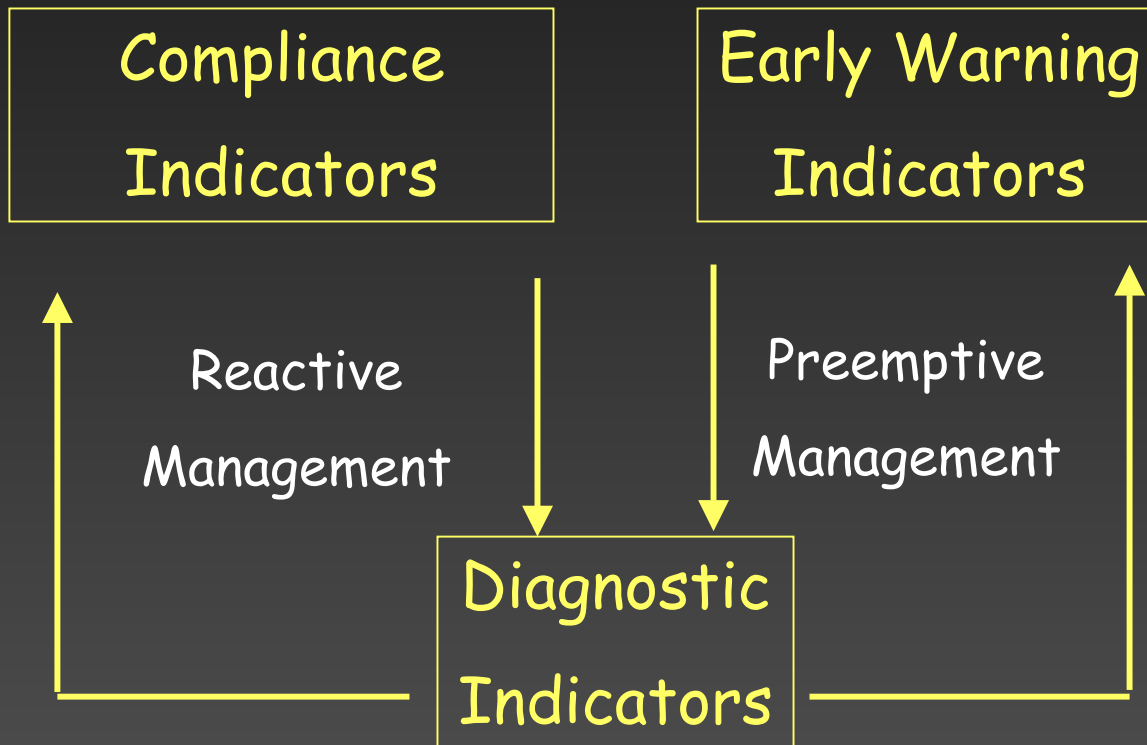
- The ecological baseline
- Understand ecosystem response
- Management applications (especially for habitat rehabilitation)

Two **Enlightened** Monitoring Program Designs:

1. Cairns, et al. 1993

Goals Objectives

Obj. 1, Obj. 2, ...



LTRMP Experience:

Fish Guys Got There First

(EPA, NRCS as latecomers)

Components Still Being Quantified as Isolated Parts

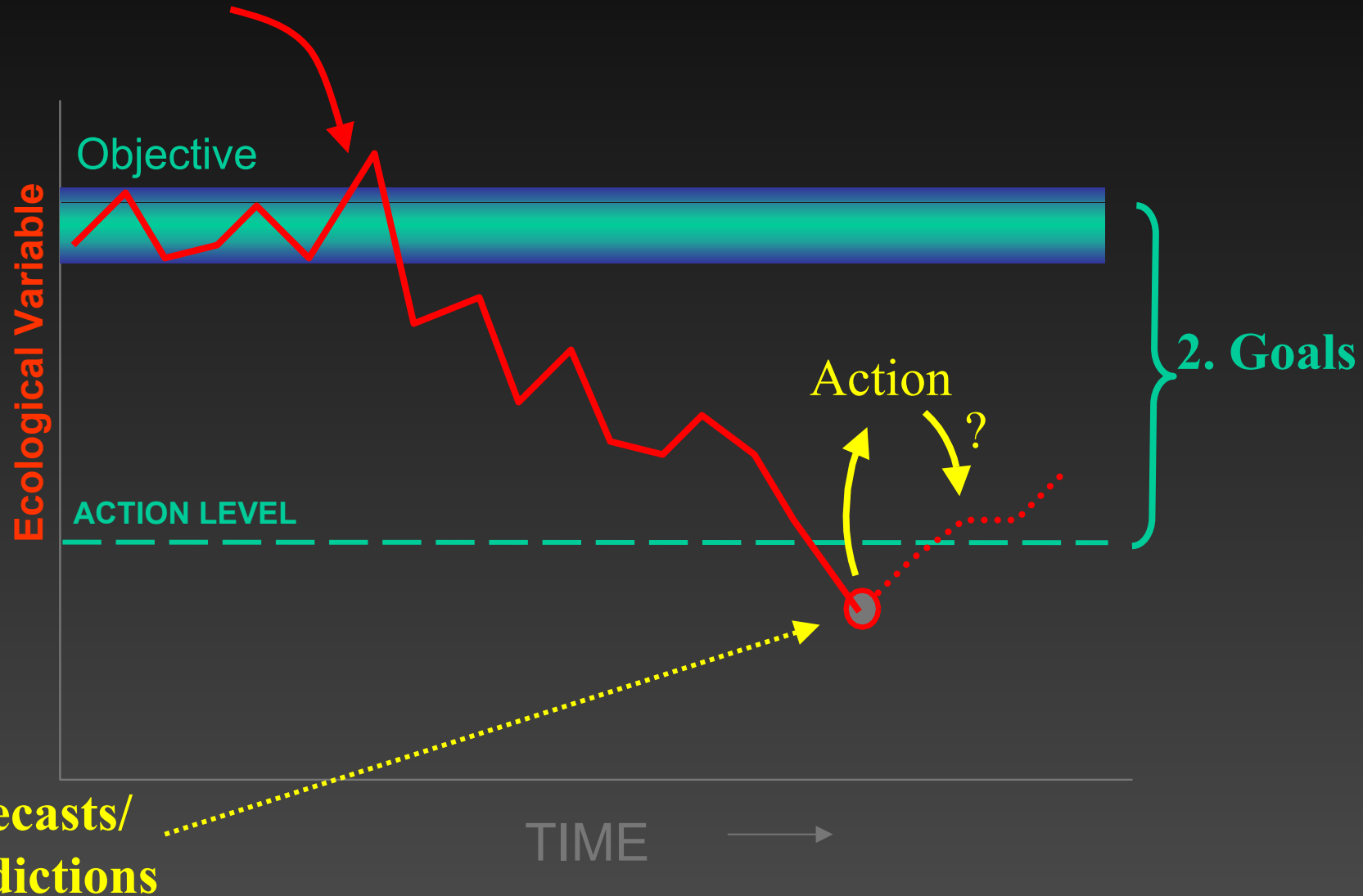
(OK for first phase, now needs attention)

Habitat Rehabilitation Disconnect

(Habitat accepted as primary Program focus;
conflict relates to scale of interest)

CATEGORIES OF INFORMATION THAT SUPPORT RIVER MANAGEMENT

1. Status and Trends



Backwater



Illinois River

Main Channel

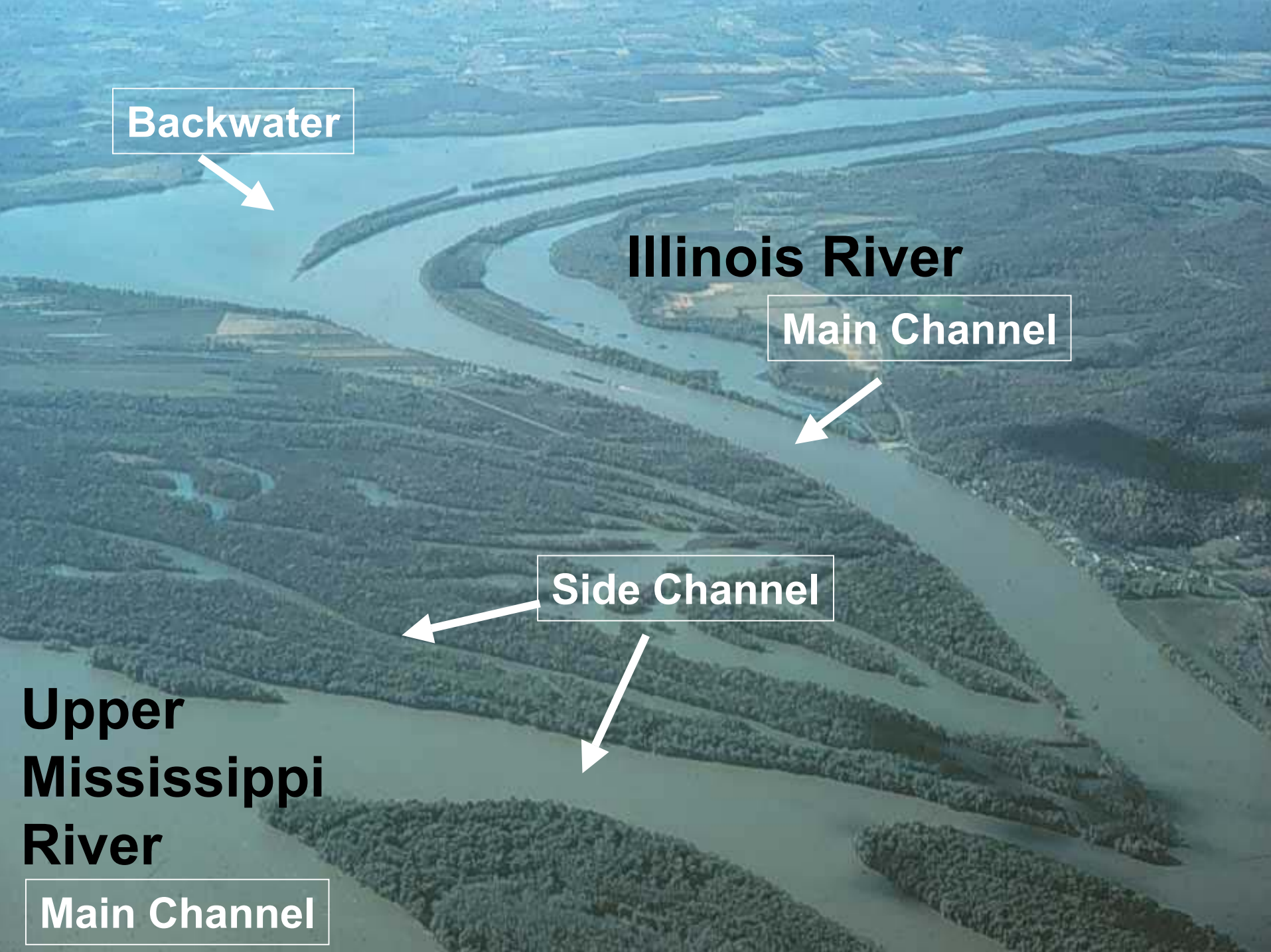


Side Channel



**Upper
Mississippi
River**

Main Channel

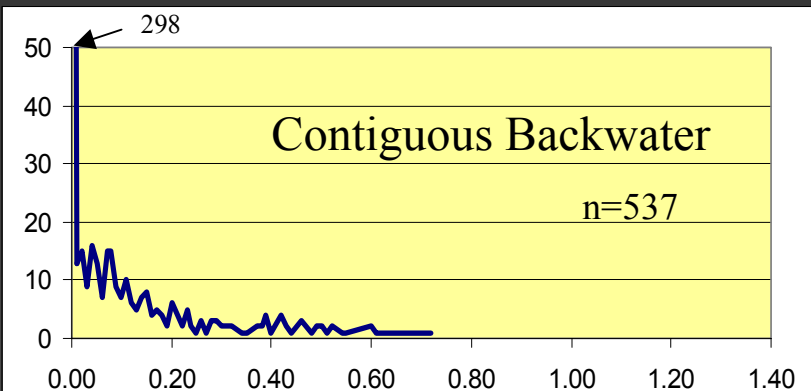
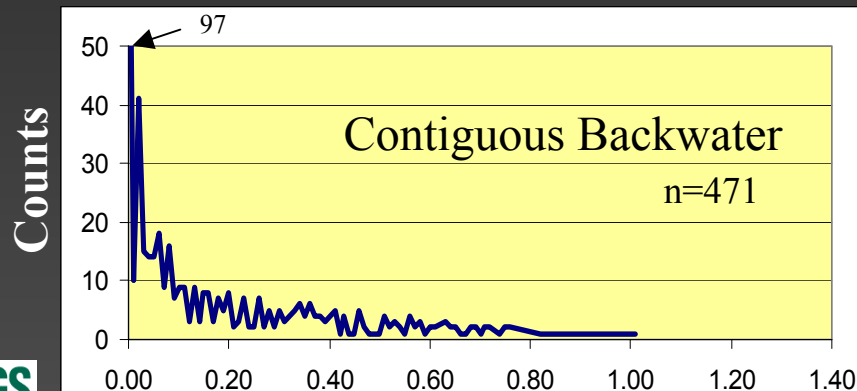
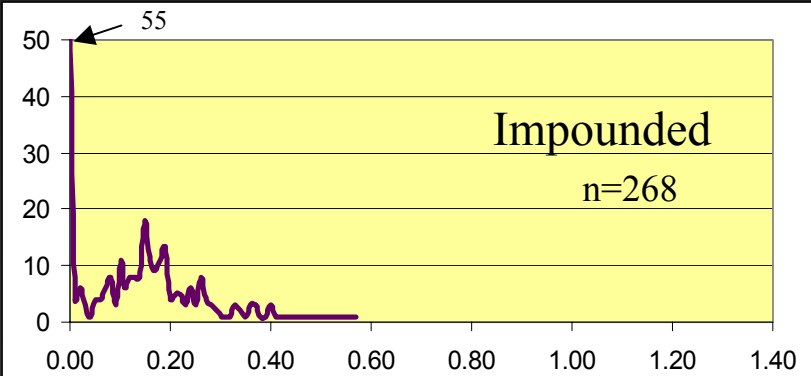
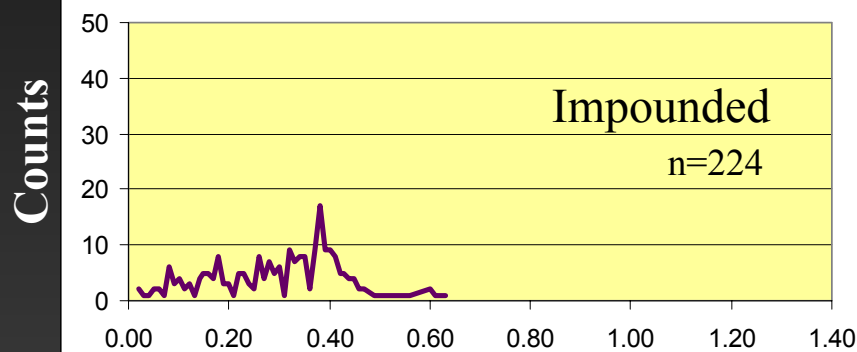
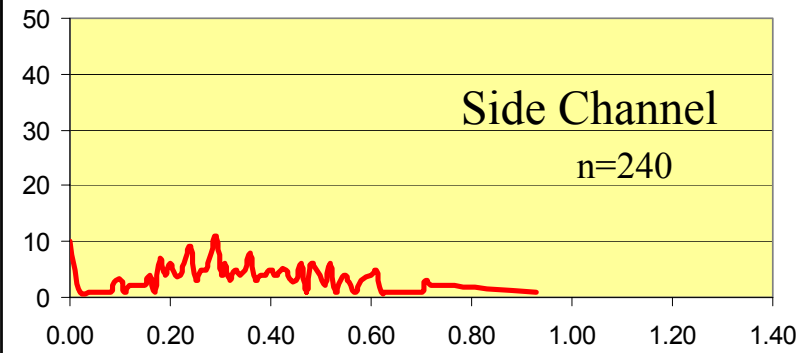
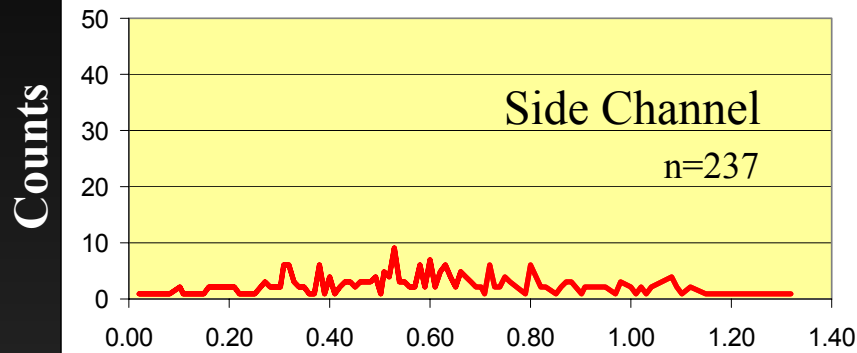


Velocity (m/sec) Frequency Distributions By Strata

April/May

Pool 13, 1993-2001

July/August

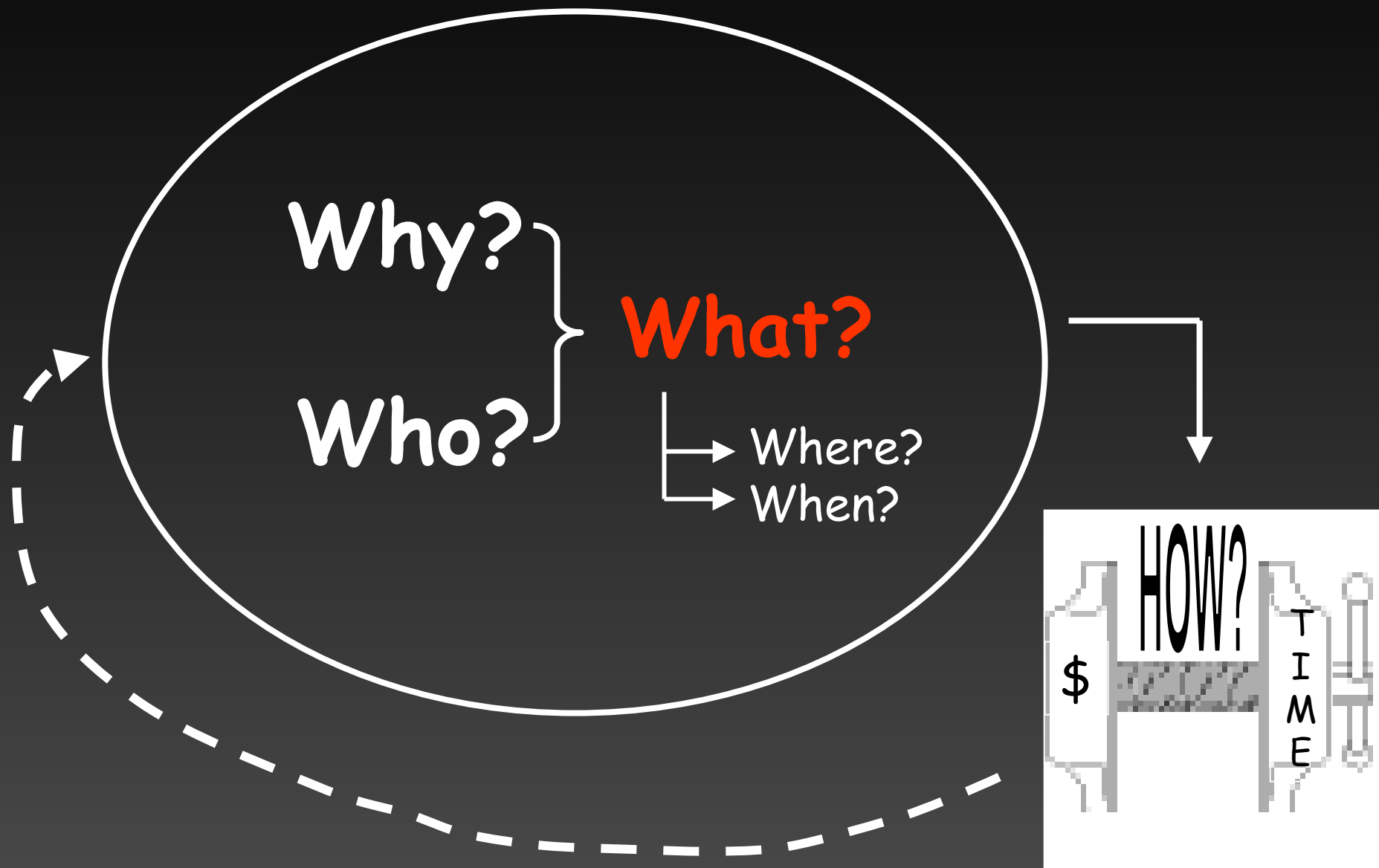


Indicator characteristics (Cairns, et al. 1993)

Biological Relevance	A	Integrative	D
Social Relevance		Historical analog	
Sensitivity to Stressors		Anticipatory	B - D
- Broad or	B	Non-destructive	
- Specific (diagnostic)	D	Potential for Continuity	
Measured/standard method	C	Appropriate Scale	B
Interpretable		Not Redundant	
- Scientifically		Timely	B - D
- Legally			
Cost-effective	???		

Notable LTRMP Grades

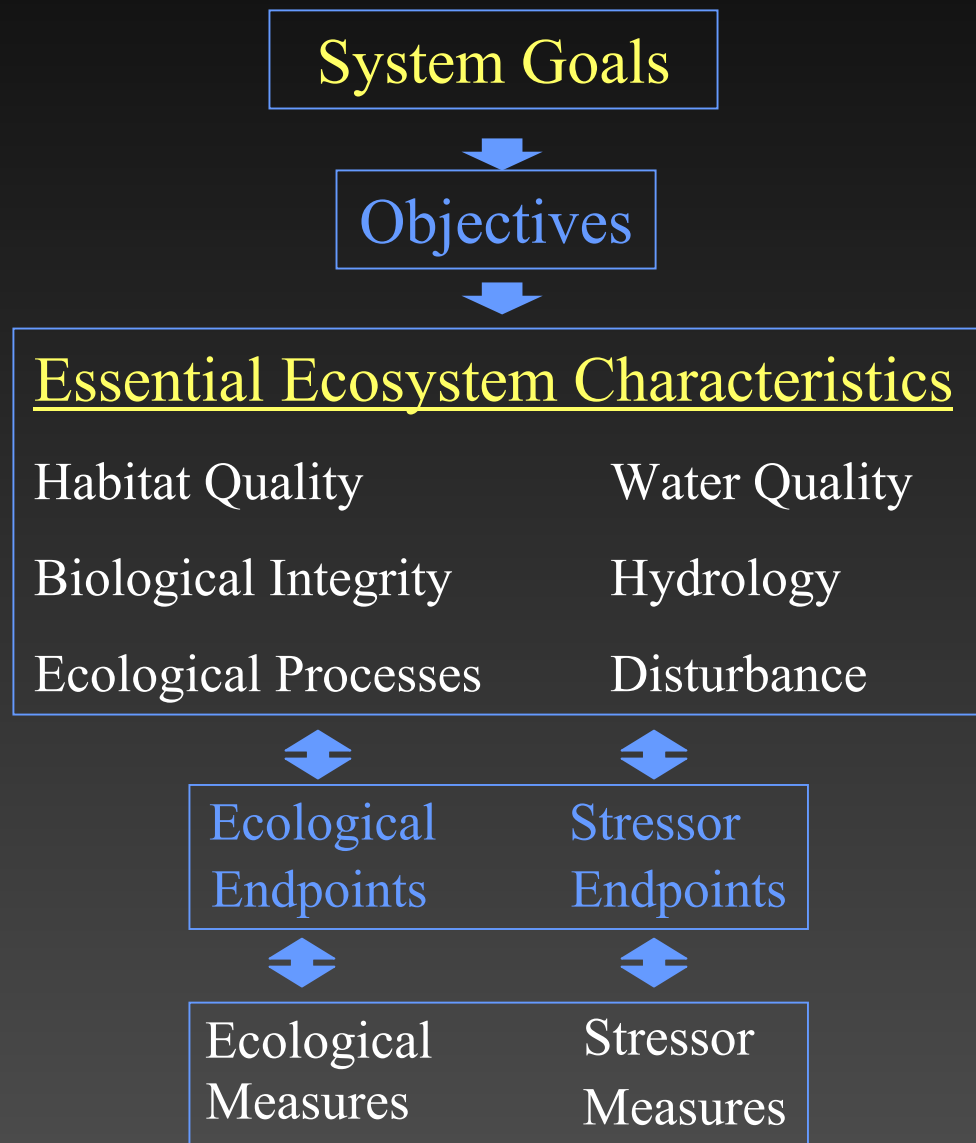
The Planning/Implementation Path:



Two **Enlightened** Monitoring Program Designs

2. Harwell, et al. 1999

**Societal
Input**



**Science
Input**

LTRMP Experience:

1. Absence of System Ecological Goals

Value of results disconnected from System Condition

2. Description vs. Explanation as separate Program Goals

Program knowledge not maturing

3. Service to Many Management Schemes Rather Than a Single Approach

Resulting in an Annual Assault to Change "What?"

Original LTRMP Monitoring Components:

- * Floodplain Habitat
- * Sedimentation
- * Water Quality
- * Discharge and
Water Elevations
- * Vegetation
- * Fishes
- * Birds
- * Wildlife
- * Mussels
- * Resource Use

What Features Adequately Convey River-Floodplain Ecological Health?

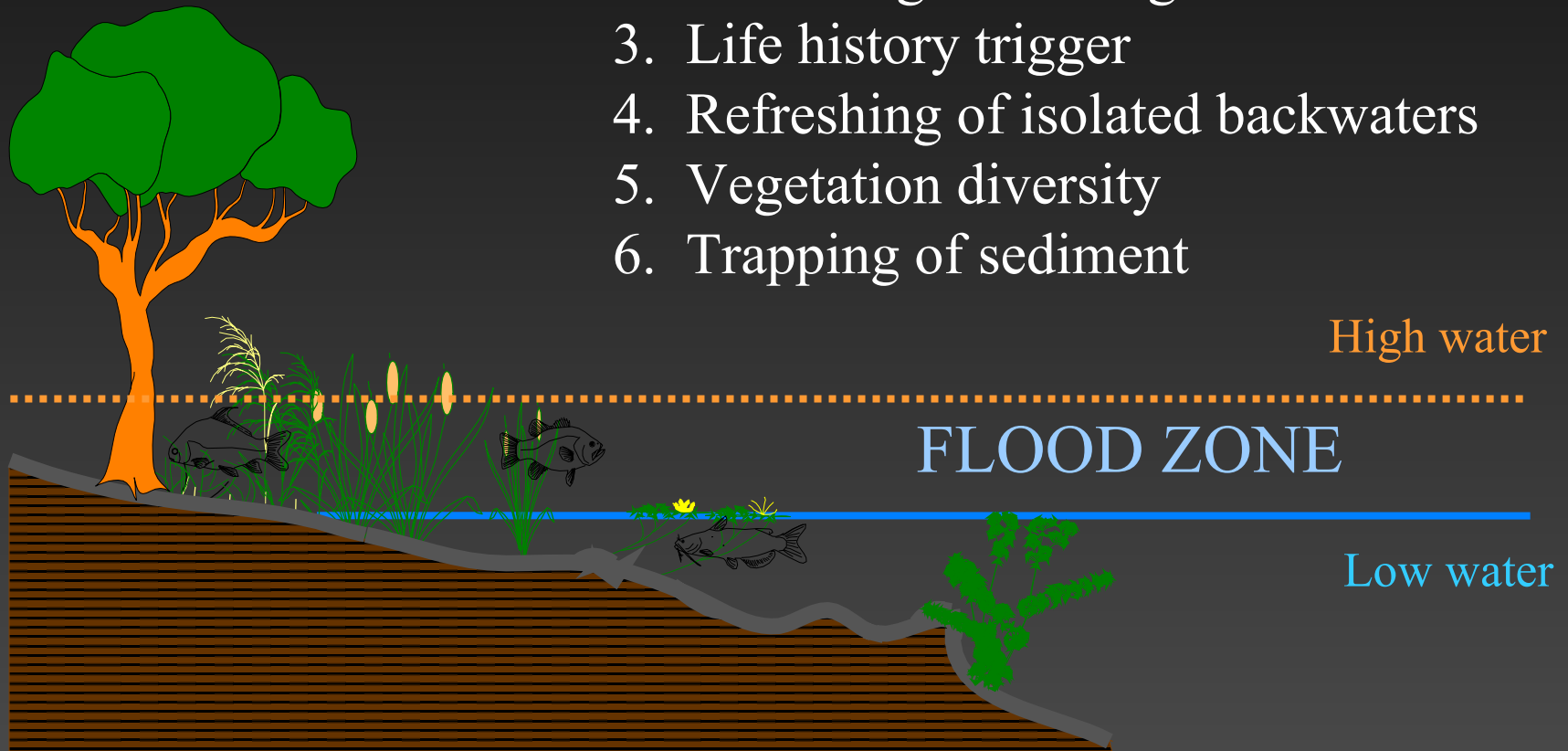
For the UMR, We Proposed:

1. Viable Populations of Native Species and Their Habitats
2. Ability to Recover from Disturbance
3. Ecosystem Sustainability
4. Ecosystem Services to Basin
5. Annual Floodplain Connectivity
6. Long-term Fluvial Dynamics

Annual Channel/Floodplain Connectivity

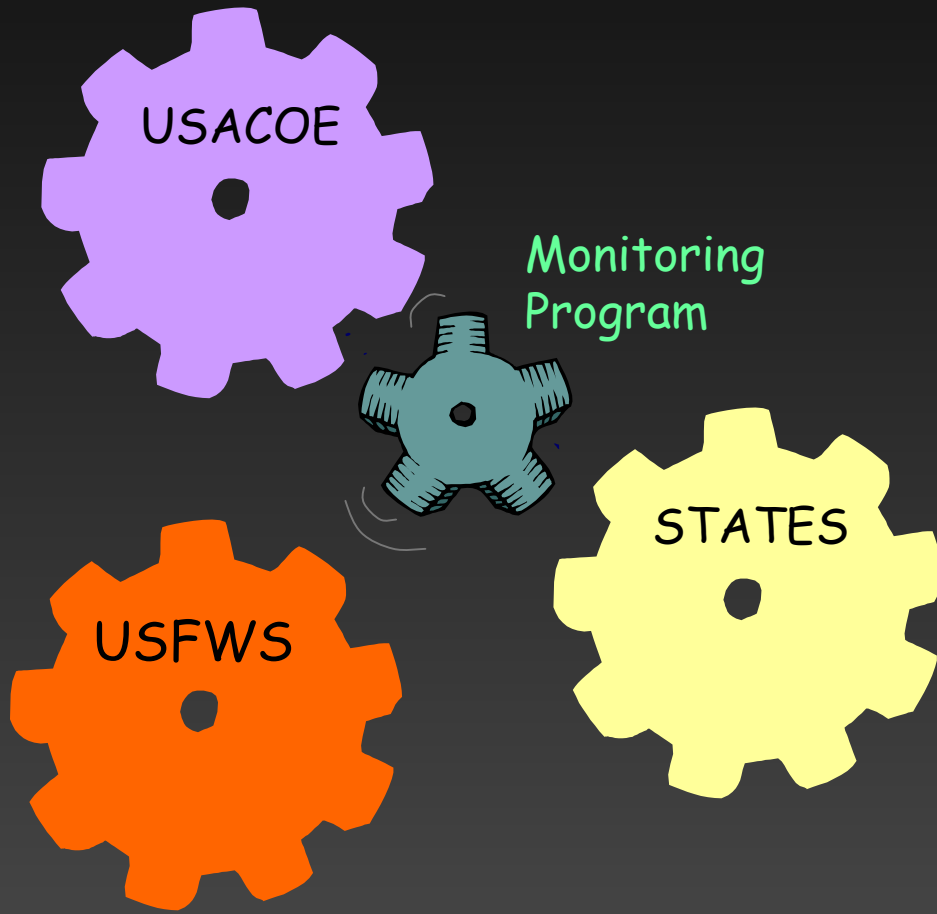
Some ecological values of annual over-bank flooding:

1. Fish spawning, feeding, growth
2. Herons/egret feeding
3. Life history trigger
4. Refreshing of isolated backwaters
5. Vegetation diversity
6. Trapping of sediment



River Management and Monitoring

Dispersed Authorities/Responsibilities -
Value of Monitoring Data Irregular



Comprehensive Management -
Monitoring Data Engaged



If Great River Monitoring is Upon Us - Suggested Points to Re-Visit:

How Many Indicators are Enough?

The Value of Diagnostic Indicators?

What's Constraining System's Return to Ecological Health?

Status/Trends Information?

Comprehensive Management?

Choose Wisely, Grasshoppers ...

